

- provide exclusive allocations for the Earth exploration-satellite (passive) service in the currently shared bands between 50.2-50.4 GHz and 54.25-56.0 GHz;
- make an allocation to the Earth exploration-satellite service (passive) in the band 60.3-61.3 GHz;
- limit use of the band 60.3-61.3 GHz to systems other than crosslinks between LEO satellites;
- move the current ISS allocation in the 54.25-58.2 GHz band, except for the small band from 56.9-57.0 GHz which is required for use by existing Government non-LEO ISS systems, into the range 65.0-71.0 GHz;
- share the currently exclusively passive band 58.2-59.0 GHz between the Earth exploration-satellite (passive) service and the fixed and mobile services;
- when the foregoing actions have been completed, delete the Earth exploration-satellite (passive) service from the band 51.4-52.6 GHz in favor of allocations to the fixed and mobile services.

5.5.4. The Teledesic Corporation Paper

Teledesic Corporation has introduced a document into IWG-5 [IWG-5/35] which supports the inclusion on the WRC-97 agenda of an allocation of the 65-71 GHz band to the intersatellite service on a co-primary basis. That paper is contained in Section 5.6.1.

5.6. Appendices

5.6.1. Proposals and Position Papers

5.6.2. List of Participants

5.6.3. List of IWG-5 Documents

5.6.4. Definition of Terms and List of Acronyms

5.6.1. Proposals and Position Papers

This section contains the following proposals and position papers:

- (1) Draft U.S. Position Paper for Agenda Item 2.2
- (2) Draft U.S. Proposal for Agenda Item 2.3
- (3) Teledesic Paper in Support of an Additional Frequency Allocation Near 60 GHz for the Inter-Satellite Service
- (4) Orbital Sciences Corporation Paper in Support of a Worldwide Upgrade to the EESS Allocation in the 8025-8400 MHz Band

**WRC-95 Industry Advisory Committee
Informal Working Group (IWG-5)**

Draft U.S. Position Paper for Agenda Item 2.2

1. TITLE: Power Limits for Earth Stations in the Space Services in the 2025-2110 MHz Band
2. CONFERENCE AGENDA ITEM: WRC-95 Agenda item 2.2.
3. ISSUE:

The U.S. proposed and WARC-92 increased the status of the space operation, space research and Earth exploration-satellite services in the band 2025-2110 MHz from Article 14 to primary status. However, WARC-92 inadvertently omitted the inclusion of an e.i.r.p. limit for earth stations in these services, which share the band with existing stations in the fixed and mobile services. Under agenda item 2.2 the power limits for earth stations in these space services will be considered.

Radio Regulations Article 28 No. 2541 provides limits for equivalent isotropically radiated power (e.i.r.p.) for earth stations in the frequency bands between 1 and 15 GHz which are shared by space and terrestrial radiocommunication services. The services and associated bands for which these limits apply are specified explicitly in RR No. 2547, and the 2025-2110 MHz band is not listed.

At the November 1994 meeting of JAHWP 7B/9D it was decided that the power limits given in No. 2541 are appropriate to apply to earth stations operating in the 2025-2110 MHz band. These power limits are:

$$\begin{aligned} &+40 \text{ dBW in any 4 kHz bandwidth for } \Theta \leq 0^\circ \\ &+40+3\Theta \text{ dBW in any 4 kHz bandwidth for } 0^\circ \leq \Theta \leq 5^\circ \end{aligned}$$

where Θ is the angle of elevation of the horizon viewed from the center of radiation of the antenna of the earth station and measured in degrees as positive above the horizon and negative below it.

4. U.S. POSITION

The United States does not intend to submit a proposal on this issue. However, we would support a proposal by another administration to apply power limits

specified in No. 2541 to the frequency band 2025-2110 MHz to protect fixed-service systems in the band.

5. FOREIGN VIEWS:

A Canadian proposal to WARC-93 for application of the No. 2541 limits to the space research service was not successful. Nevertheless, the Canadians were instrumental in placing this issue on the WRC-95 agenda. It is probable that the Canadians will resurrect their proposal regarding application of the No. 2541 e.i.r.p. limits.

6. STRATEGY:

Apply power limits for Earth stations in the space services specified in No. 2541 to the frequency band 2025-2110 MHz to protect the fixed-service systems in the band.

7. FALLBACK POSITION:

TBD

8. SUPPORTING REFERENCES:

CPM Report, Chapter 2, Section II

C00274

WRC-95 INDUSTRY ADVISORY COMMITTEE
INFORMAL WORKING GROUP (IWG-5)

DRAFT USA CONFERENCE PROPOSALS FOR THE 13.75-14.0 GHZ BAND
RESOLUTION 112

AGENDA ITEM 2.3

MOD 855A In the band 13.75-14.0 GHz, the e.i.r.p. of any emission from an earth station in the fixed-satellite service shall be at least 68 dBW, and should not exceed 85 dBW, with a minimum antenna diameter of 4.5 meters. In addition the e.i.r.p., averaged over one second, radiated by a station in the radiolocation and radionavigation services towards the geostationary orbit shall not exceed 59 dBW. ~~These values shall apply subject to review by the CCIR and until they are changed by a future competent world administrative radio conference (see Resolution 112). (see Recommendation ITU-R S.1068).~~

MOD 855B In the band 13.75-14.0 GHz geostationary space stations in the space research service, for which information for advance publication has been received by the ~~IFRB~~ ITU-R prior to 31 January 1992, shall operate on an equal basis with stations in the fixed-satellite service; after that date new geostationary space stations in the space research service will operate on a secondary basis. Until 1 January 2000, stations in the fixed-satellite service shall not cause harmful interference to non-geostationary space stations in the space research and earth exploration-satellite services; after that date these non-geostationary space stations will operate on a secondary basis in relation to the fixed-satellite service. (see Recommendations ITU-R S.1069 and ITU-R SA.1071).

000275

SUP RESOLUTION 112

REASONS: Resolves 1 of Resolution 112 called for studies, with respect to the values given in No. 855A of the Radio Regulations relating to allocations in the band 13.75-14.0 GHz and to report the outcome at least one year before the next competent conference. ITU-R Task Group 4-4 was formed to perform the necessary studies. This Task Group completed its studies and confirmed the values given in No. 855A. Recommendation ITU-R S.1068 was developed with respect to the sharing of the fixed-satellite service with the radiolocation and radionavigation services.

Resolves 2 of Resolution 112 called for studies with respect to the technical compatibility between the primary allocation to the fixed-satellite service (Earth-to-space) and the secondary allocations to the space research and Earth exploration-satellite services. ITU-R Task group 7-3 was established to study this compatibility taking into account the time frames given in No. 855B. Task Group 7-3 developed protection criteria for the secondary services. Task Group 4-4 considered constraints which would apply to the fixed-satellite service to meet these protection criteria within the time frames given in No. 855B. The two Task Groups, in close consultation, developed two companion Recommendations: ITU-R S.1069 and ITU-R SA.1071. These Recommendations provide further technical details with respect to the compatibility between the fixed-satellite services and these secondary services.

The CPM Report addresses WRC-95 Agenda Item 2.3" to review Resolution No. 112 in light of the results of studies carried out in application of that Resolution and take appropriate action". The CPM-95 concluded that all necessary studies have been performed and the results of these studies, including mutually satisfactory criteria, are contained in the above ITU-R Recommendations, and recommended suppression of Resolution 112.

C00276

06 December 1994

Ms. Diane Garfield
Chair, Informal Working Group 5
Industry Advisory Committee for WRC 95
U.S. Department of State
2201 C Street, N.W.
Room 6312
Washington, DC 20520-6317

Dear Ms. Garfield:

Orbital Sciences Corporation ("Orbital") is pleased to provide support to the National Aeronautics and Space Administration (NASA) presentation (file number IWG-5/16) to Industry Working Group (IWG) #5. In its letter, NASA presented several important items for consideration as agenda items for WRC-97. Item Number 3 is a request for a global upgrade of the EESS (Earth Exploration Satellite Service). Orbital offers the following comments supporting item Number 3:

Item 3. (Quoted from NASA letter, IWG-5/16)
Review of the Status of Allocations to Non-sensor EESS and SRS
in the Range 8-20 GHz as specified in Res 712 (WARC-92) and
WRC-97 Agenda Item 2.1

3.1 8025-8400 MHz band

REASON: The 8025-8400 MHz EESS communication band has an inequitable table status. It is primary in Region 2 only (subject to Article 14 in Regions 1 and 3) and yet the telemetry from Earth resources sensors has been successfully transmitted to Earth in all three ITU Regions for many years now. Furthermore, the sharing

situation in all three regions is equivalent in terms of services allocated. The 8 GHz band is the only band available for wideband EESS data downlinking, for both government and non-government users, below 65 GHz.

STATUS: This band is specified in the considerations of Resolution 712 (WARC-92) and is covered in the resolves of that Resolution. Most of the sharing criteria were developed prior to its current allocation status achieved at WARC-1979. Appendix 28 coordination parameters were recently published in ITU-R Recommendation 849 and these should be incorporated into the Radio Regulations as well.

Orbital RESPONSE: Orbital supports the above NASA position. The 8025-8400 MHz region, as an EESS band, is a critical resource that requires maximum protection on a global basis. This band is rapidly becoming critical to newly created and licensed private remote sensing systems that plan operations in each ITU Region. Therefore, Orbital believes and supports Resolution 712 and recommends the establishment of a common primary allocation for EESS in the 8025-8400 MHz region on a worldwide basis with appropriate coordination parameters.

In the Land Remote Sensing Commercialization Act(s) of 1984 and 1992 the US Congress recognized that remote sensing serves and benefits the public interest. Space-based remote sensing, which is primarily conducted in frequency bands allocated for EESS, serves the public interest in studying and understanding human impacts on the global environment, in managing the Earth's natural resources, and in planning and conducting many other activities of scientific, economic and social importance. This represents a significant global benefit and, therefore, justifies a global requirement for primary wideband EESS services.

Orbital supports all efforts for a worldwide upgrade to the EESS allocation in the 8025-8400 MHz band and highly recommends that IWG-5 and the IAC (Industry

Advisory Committee) support the NASA recommendation. Comments or questions may be directed to the undersigned at (703) 406-5409.

Sincerely,

SIGNED and PRESENTED TO IWG-5 CHAIRMAN / 06 DEC 94

James E. Byrd, Jr.
Spectrum Management

**Additional Frequency Allocation Near 60 GHz
for the Inter-Satellite Service (ISS)**

Teledesic Corporation has applied to the FCC for a license to build and operate a Non-Geostationary Orbit Fixed-Satellite Service (NGSO-FSS) system that would provide global interconnectivity via wide band (bandwidth on demand) communications. In that application, it is proposed to use 59.5 - 60.5 and 62.5 - 63.5 GHz for inter-satellite links (ISL's) to interconnect the satellites and to provide the message routings between different points on the Earth.

Frequency overlap with another user of the inter-satellite service allocation from 59-64 GHz has led to a request for Teledesic to reposition its ISL frequencies to 56.75 - 57.75 GHz and 59.0 - 60.0 GHz. In the band 54.25 - 58.2 GHz there is a co-primary allocation to the Earth exploration-satellite service for passive sensing of scientifically unique oxygen absorption lines. This band is used to carry out atmospheric temperature measurements on an operational basis that are needed in weather forecasting and climate studies. Teledesic inter-satellite links with their large number of active transmitters in low-earth orbit have the potential to interfere with the Earth pointing passive sensors of the Earth exploration-satellite service.

Thus, to provide for continued growth of satellite communications that would use ISL frequencies near 60 GHz, Teledesic corporation supports the inclusion on the agenda of WRC-97 of:

"The allocation of the band 65.0-71.0 GHz to the Intersatellite Service on a primary basis."

5.6.2 List of Participants

<u>Participant</u>	<u>Organization</u>
Byrd, James	OSC
Cager, Ralph	CSC
Carroll, James R.	SFA
Cheston, T. Stephen	Iridium
Garfield, Diane	State Department
Gutierrez-Luaces, Benito	NASA/JPL
Holiday, Cecily	FCC
Huang, Bob	Comsat World Systems
Hutchinson, Kris	ARINC
Irion, Karyl	CSC
Jansky, Don	Jansky/Barmat
Kiebler, John	MITRE
LaForge, Ray	FCC
Long, Bill	DISA
Manner, Jennifer	Teledesic
May, Bob	USAF
Miller, Edward	Telesesic
Miller, J.E.	STel
Musarra, Gerald	Lockheed
Pattan, Bruno	FCC
Richards, Warren	State Department
Rinaldo, Paul	ARRL
Rinker, Alan	CSC
Sharkey, Steve	FCC
Struba, David	NASA
Taylor, Robert	NASA
Wiggen, Gerry	SFA Inc.
Wilson, Brett	Rockwell
Wright, Rich	CSC

000281

5.6.3. List of IWG-5 Documents

<u>Number</u>	<u>Document Title</u>
IWG-5/1	IWG-5 Meeting Agenda June 14
IWG-5/2	Agenda for the 1995 World Radiocommunication Conference
IWG-5/3	Terms of Reference for IWG-5
IWG-5/4	WRC-95 Industry Advisory Committee Proposed Work Program for IWG-5 Space Services
IWG-5/5	Proposed IAC Meeting Schedule
IWG-5/6R	WRC-95 Industry Advisory Committee Meeting Schedule for IWGs 1-5
IWG-5/7	Resolution 112 (WARC-92)
IWG-5/8	Resolution 712 (WARC-92)
IWG-5/9	IWG-5 meeting Minutes June 14
IWG-5/10	IWG-5 Meeting Agenda July 11
IWG-5/11	Draft New Recommendation [ITU-R SA.DOC. 4/210] - Fixed-Satellite and Radiolocation/Radionavigation Sharing in the Band 13.75-14.0 GHz
IWG-5/12	Draft New Recommendation [ITU-R SA.DOC. 4/211] - Compatibility Between the FSS and the Space Science Services in the Band 13.75-14.0 GHz
IWG-5/13	Draft New Recommendation [ITU-R SA.DOC. 7/125] - Use of the 13.75-14.0 GHz Band by the Space Science Services and the Fixed-Satellite Service
IWG-5/14	Frequency Allocations for Spaceborn Microwave Sensors
IWG-5/15	Draft Proposal to PP-94 - Review of the ITU's Satellite Planning and Coordination Framework
IWG-5/16	NASA Information Document on Issues Currently Under Study
IWG-5/17	Draft U.S. Proposal for Agenda Item 2.2
IWG-5/18	Draft Conference Proposal for the 13.75-14.0 GHz Band - Resolution 112
IWG-5/19R	Liaison Note to IWG-4 on MSS Feeder Links in the 13.75-14.0 GHz Band
IWG-5/20	not assigned
IWG-5/21	IWG-5 Meeting Minutes July 11
IWG-5/22	NASA Information Document on Proposed Use of the Shared Allocation at 54.25-58.2 GHz Between the Earth Exploration and the Intersatellite Services
IWG-5/23	IWG-5 Meeting Agenda August 9
IWG-5/24	IWG-5 Meeting Agenda September 7
IWG-5/25	IWG-5 Meeting Minutes August 9

000282

IWG-5/26 IWG-5 Meeting Agenda October 18
 IWG-5/27 Reverse Band Working Feeder Links in the 13.75 to 14.0 GHz
 Frequency Band Sharing With Radiolocation/Radionavigation Services
 IWG-5/28 Liaison Note to IWG-4 on RBW Feeder Links in the 13.75-14.0 GHz
 Band Sharing with Radionavigation/Radiolocation
 IWG-5/29 Information Document - Resolution 712 (WARC-92) Issues
 IWG-5/30 Information Document - WRC Issues Other than Resolution 712
 IWG-5/31 IWG-5 Meeting Minutes September 7
 IWG-5/32 Liaison Note to Chair IWG-6 on Space Service Issues for Future
 Conferences
 IWG-5/33 IWG-5 Meeting Agenda November 14
 IWG-5/34 Interim Report to the IAC - Draft Outline
 IWG-5/35 Additional Frequency Allocation Near 60 GHz for the Inter-Satellite
 Service (ISS)
 IWG-5/36 IWG-5 Meeting Minutes October 18
 IWG-5/37 IWG-5 Meeting Minutes November 14
 IWG-5/38 Orbital Sciences Corporation Paper in Support of a Worldwide Upgrade
 to the EESS Allocation in the 80258400 MHz Band
 IWG-5/39 IWG-5 Meeting Agenda December 6
 IWG-5/40 IWG-5 meeting Minutes December 6
 IWG-5/41(R1) WRC-95 Industry Advisory committee Meetings for Informal Working
 Groups 3, 4, & 5
 IWG-6/42 IWG-5 Interim Report to the Industry Advisory Committee
 IWG-5/43 IWG-5 Meeting Agenda 12 January
 IWG-5/44 Consolidated Report to the CPM
 IWG-5/45 IWG-5 Meeting Minutes January 12
 IWG-5/46 IWG-5 Meeting Agenda 9 February
 IWG-5/47 IWG-4/38: U.S. Allocation Proposals in Ku-band for the 13.75-14.0
 GHz and 15.4-15.7 Bands to Allow for Operation of NGSO MSS Feeder
 Links
 IWG-5/48(R1) Liaison Statement from IWG-5 to IWG-6
 IWG-5/49(R1) U.S. Position Paper on Power Limits for Earth Stations in the 1015-2110
 MHz Band
 IWG-5/50 Liaison Letter from IWG-5 to IWG-4: Response to Proposal on Use of
 the 13.75-14.0 GHz Band for RBW Feederlinks
 IWG-5/51 IWG-5 Meeting Minutes 9 February
 IWG-5/52 IWG-5 Meeting Agenda 2 March
 IWG-5/53 IWG- Meeting Minutes 2 March
 IWG-5/54 IWG-5 Draft Final Report to the Industry Advisory Committee
 IWG-5/55 IWG Meeting Agenda 11 April

5.6.4 List of Acronyms

CCIR	International Radio Consultative Committee
CEPT	Conference of European Posts and Telegraphs
CITEL	International Commission on Telecommunications
CPM	Conference Preparatory Meeting
dB	decibel(s)
dBW	decibels referred to 1 watt of power
e.i.r.p.	equivalent isotropically radiated power
EESS	Earth Exploration-Satellite Service
FCC	Federal Communications Commission
FSS	Fixed Satellite Service
GHz	gigahertz
IAC	Industry Advisory Committee
IFRB	International Frequency Registration Board
IRAC	Interdepartment Radio Advisory Committee
ISL	Inter-Satellite Link
ITU	International Telecommunication Union
ITU-R	Radiocommunication Sector of the ITU
IWG	Informal Working Group
JAHWP	Joint ad hoc Working Party
JIWP	Joint Informal Working Party
JWP	Joint Working Party
KHz	kilohertz
km	kilometer(s)
LEO	Low Earth Orbit
m	meter(s)
MHz	megahertz
MSS	Mobile Satellite Service
NASA	National Aeronautics and Space Administration
NASDA	National Space Development Agency of Japan
NGSO	Non-Geostationary Orbit
NGSO-FSS	Non-Geostationary Orbit Fixed Satellite Service
pdf	power flux density
RBW	Reverse Band Working
RCS	Radio Conference Subcommittee
RR	Radio Regulation
SAR	Synthetic Aperture Radar
SFCG	Space Frequency Coordination Group
SG	Study Group

000284

SRS	Space Research Service
TDRSS	Tracking and Data Relay Satellite System
TG	Task Group
TRMM	Tropical Rainfall Measuring Mission
USTG	United States Task Group
USWP	United States Working Party
W/m ² /4 kHz	Watts per square meter per 4 kilohertz of bandwidth
WARC	World Administrative Radio Conference
WMO	World Meteorological Organization
WP	Working Party
WRC	World Radiocommunication Conference

000285

FCC INDUSTRY ADVISORY COMMITTEE
FOR THE
ITU 1995 WORLD RADIO COMMUNICATION CONFERENCE

~ ~ ~ ~

FINAL REPORT
OF
INFORMAL WORKING GROUP 6

~ ~ ~ ~

Leonard J. Kennedy
Chair

Loretta Garcia
Vice Chair

000286

IWG-6 Future Conferences Final Report

6.1. Introduction

The original terms of reference and work program sought recommendations and proposals related to the preliminary WRC-97 and WRC-99 agendas. The Addendum to the terms of reference and work program called for a recommended proposal for future FCC conference preparation. The WRC-95 agenda was preliminarily set by WRC-93 and finalized by the Kyoto Plenipotentiary Conference.

Four new proposals for consideration at WRC-97 were submitted to IWG-6 for review and are discussed in this report. The proposals were submitted by Teledesic Corp. and Motorola, Inc., TIA, ITS America and AT&T.¹ IWG-5 submitted a paper for consideration. IWG-3 also referred matters to IWG-6. One proposal was submitted for the Preliminary Agenda for WRC-99.

Finally, IWG-6 believes that ongoing efforts to prepare for international conferences is critical. IWG-6 members believe that timely Advisory Committee renewal is the most effective means of ensuring necessary input to the United States Government in preparing for future World Radiocommunication Conferences.

6.2. WRC-97 Agenda

6.2.1. New proposals identified by IWG-6

6.2.1.1 Proposal to Consider Regulatory Aspects of NonGeostationary Fixed Satellite Service and Mobile Satellite Service Networks - Submitted by Teledesic Corp. and Motorola, Inc.

The Industry Advisory Committee recommends that an item be placed on the agenda of WRC-97 concerning allocations and regulatory provisions for non-GSO systems operating in the fixed satellite service ("FSS") and/or the mobile satellite service ("MSS") in the 17.7 - 59.0 GHz range.

Item to be Supported: If a sufficient non-GSO allocation is not accomplished at WRC-95 to accommodate all proposed non-GSO systems, or if other non-GSO systems are

¹ There was substantial objection by Loral/QUALCOMM to the submission by IWG-6 of AT&T's proposal to the Commission. Comsat Mobile Communications joins Loral/QUALCOMM in opposing AT&T's proposal.

proposed in the 17.7 - 59.0 GHz bands subsequent to WRC-95, an item should be added to the WRC-97 Agenda to consider the allocation on a primary basis of sufficient spectrum in the 17.7 - 59.0 GHz bands to accommodate proposed non-GSO satellite systems operating in the FSS and/or MSS. Even if spectrum is allocated for non-GSO MSS feeder links or for non-GSO satellite systems at WRC-95, action at WRC-97 may be required to allocate sufficient spectrum for additional non-GSO MSS feeder links or for service links for other proposed non-GSO satellite systems. Adoption of this agenda item is necessary if sufficient suitable spectrum is to be identified and made available on a primary basis for proposed and authorized global non-GSO satellite systems.

By having an agenda item which covers a wide range of FSS and MSS allocations above 17.7 GHz, the U.S. and other administrations would have greater flexibility in accommodating the needs of non-GSO FSS and MSS systems. Indeed, as lower bands allocated to the FSS become increasingly congested, FSS allocations in the 37.5 - 50.0 GHz range will be the next available bands for the implementation of such systems. In fact, the FCC has recently initiated a proceeding (ET Docket No. 94-124) aimed at opening spectrum in the 40 GHz range for commercial development.

Reasons for Addressing Item in International Forum: Since the proposed agenda item concerns modification of the International Table of Frequency Allocations and associated procedures, this issue needs to be addressed by a competent international radio conference.

U.S. Interest in Supporting This Item: It is in the interest of the United States to support inclusion of allocations and regulatory aspects for proposed non-GSO systems operating in the FSS and/or the MSS in the 17.7 - 59.0 GHz bands on the WRC-97 Agenda since failure to allocate sufficient spectrum for non-GSO systems could adversely impact the development of these systems both domestically and internationally.

RESOLUTION NO. XXX

The 1995 World Radiocommunication Conference

considering

- a) that the ITU Radio Regulations governing satellite communications have generally evolved to fit the characteristics of GSO satellites;
- b) that GSO and non-GSO satellite systems have fundamentally different system characteristics which need to be accommodated through different regulatory provisions;
- c) that there are significant differences between the methods by which GSO and non-GSO systems share the same frequencies;
- d) that Radio Regulation 2613 (WARC-92) was developed to protect GSO systems and places non-GSO satellite systems, including non-GSO MSS feeder links, at a disadvantage;
- e) that allocations and provisions are needed to accommodate additional newly proposed non-GSO satellite systems in the FSS and MSS allocations in the range 17.7 - 59.0 GHz.

recognizing

that there is a need to provide equitable access to the 17.7 - 59.0 GHz bands for non-geostationary orbit satellite systems planned and proposed to operate in FSS and/or MSS allocations in this frequency range

resolves

that an agenda item for the 1997 World Radiocommunication Conference should be as follows: frequency allocations and regulatory aspects related to non-geostationary orbit systems operating in the FSS and/or the MSS in the range 17.7 - 59.0 GHz.

6.2.1.2 Terrestrial Mobile for Public Safety Applications - Submitted by TIA

TIA seeks IWG-6 support for: (1) inclusion of a Resolution on the WRC-97 agenda to identify mobile spectrum below 1 GHz on a regional or global basis for terrestrial public safety applications; and (2) effort at WRC-95 both to ensure that the WRC-97 agenda permits such an identification and direction to the Radiocommunication Sector to initiate or continue studies to further this goal.

6.2.1.2.1 General Background

Over the past 60 years, mobile radio in the United States has experienced rapidly increasing growth, reflecting a society that is itself more mobile. This mobile service has embodied stations, mobiles and portable, all of which operate on the surface of the earth. (We thus designate this application as "terrestrial" to differentiate it from the technology of mobiles linked directly to satellite(s).) The advent of the global information age is expected to accelerate this terrestrial trend, as the volume and types of communications demanded increase over time.

The growth in land mobile radio services has depleted the available terrestrial spectrum throughout many parts of the world, particularly in the United States. Although new technologies promising more efficient spectrum utilization can temporarily address terrestrial spectrum congestion, additional allocations will nonetheless be needed to satisfy the increasing demand.

This is particularly true in the case of terrestrial mobile spectrum used for public safety applications. These public safety services are important and time critical, but are not otherwise part of existing safety and distress allocations.

Most such allocations are normally addressed at a national level as opposed to internationally. Additional benefits can be derived, however, through international standardization of terrestrial public safety communications use of mobile services spectrum allocations: (1) countries can gain economies of scale by having manufacturers develop lower cost equipment and technologies suitable for much larger markets; and (2) where permitted, mobile operation in bordering countries can achieve interoperability of communications. This latter point is particularly important to entities meeting public safety needs, whose emergency requirements often traverse national boundaries.

6.2.1.2.2 Spectrum Considerations

Because public safety organizations have limited funding, it is important to identify spectrum in which operations are relatively inexpensive. Mobile radio systems for frequencies below 1 GHz tends to be significantly less expensive than systems designed to operate at higher frequencies. Accordingly, TIA proposes that band(s) below 1 GHz be considered first. Furthermore, while sharing with other satellite systems or more usage-intensive mobile systems may be impossible, sharing with terrestrial mobile systems may be a good fit. This is particularly true for systems with public safety applications.

For example, a potentially unique opportunity is expected to arise in the next few years in the bands 380-399.9 MHz. This band is now allocated for fixed or mobile services in all three ITU regions, but is typically used for government systems. In the U.S., Europe and other regions, the spectrum is used for governmental and military systems. NATO now permits these bands, based on national decisions and subject to their acceptance of interference from frequency hopping systems, to be used for "emergency" services on a shared basis.² The CEPT's Detailed Spectrum Investigation also suggested shared use of the 380-400 MHz band for terrestrial mobile systems.³

6.2.1.2.3. Public Interest

In the past, new spectrum allocations for terrestrial land mobile radio have encouraged the development of new technologies providing increased efficiencies and needed services to the public. For example, the domestic allocation at 800 MHz in the 1970s for a variety of services revolutionized the communications industry and led to the creation of thousands of new jobs in America and across the globe. More recently, the advent of personal communications services (PCS) promises a new and higher quality of service to the American public and has allowed the United States again to take the lead in formulating the parameters of a new mobile technology. At the same time, mobile services offering public safety applications are increasingly used and useful throughout the nation, for example, through the Emergency Medical, Special Emergency, Railroad, Police and Fire services allocated in Part 90 of the FCC's rules.

Today, there is once again a shortage in the United States of available spectrum for terrestrial land mobile services. Despite the fact that new communications technologies are making ever more efficient use of existing spectrum possible, the Commission recently confirmed that public safety organizations may have filled all available frequencies by 2010,

² See Memorandum, M. Tange, Chairman NATO/ARFA, to ARFA Distribution, ARFA(E)-C(94)-1982L-SPA/530/1 (November 30, 1994).

³ CEPT Detailed Spectrum Investigation, Phase II: 29.7-960 MHz (September 22, 1994) (See attached).

and proposed to collect additional data to quantify the shortfall. *Report and Plan for Meeting State and Local Government Public Safety Agency Spectrum Needs Through the Year 2010*, FCC 95-55 (Feb. 9, 1995). This is particularly true for the new and advanced public safety needs requiring significantly greater bandwidths than conventional services.

In the U.S., this search for more spectrum has already prompted a Petition for Rulemaking filed by the Coalition of Private Users of Emerging Multimedia Technologies (COPE) seeking allocation of 75 MHz below 3 GHz. The petition focused on the important new (and bandwidth intensive) services expected to be carried on private land mobile services by the turn of the century. Additional spectrum, the petition noted, was essential to permit private land mobile services to take a "quantum leap" forward in serving the public.

6.2.1.2.4. Regulatory Issues

The sole regulatory issue raised by this proposal is whether the ITU can specify that the terrestrial land mobile spectrum so allocated can be targeted toward public safety applications. A useful precedent on this subject is the WARC-92 efforts on FPLMTS, where spectrum allocated for mobile services was characterized in Resolutions and footnotes as being "identified" for use by FPLMTS. The attached Resolutions consciously parallel this approach.

6.2.1.2.5. Sharing

The attached IWG-6 proposed Resolution would, in addition to identify particular spectrum, encourage the development of sharing conditions for that spectrum. As evidenced by the preliminary agreement of NATO in Europe, increased sharing to accommodate additional terrestrial uses appears feasible. TIA recommends both that the Commission and the U.S. private sector investigate sharing for the U.S. as well as seek analysis of the sharing issue at the Radiocommunication Sector so that these benefits can be enjoyed globally.

The fact that the sharing investigation requires information regarding the existing governmental systems will make investigation somewhat more difficult but not impossible. First, any other new use of this spectrum would require a similar sharing analysis. Second, to the extent that the existing users of the spectrum seek sharing, they will have an incentive to cooperate in any ITU-R efforts. Finally, the characteristics of the existing systems in the band can be approximated from known parameters of similar systems.

6.2.1.2.6. Timing

To meet the need identified above, it is essential that upcoming WRCs be competent to address the issues, including the ability to make changes in the international Table of Allocations. The potential opportunities for sharing with existing governmental systems also represent a reason to push this issue in forthcoming conferences. However, as noted above, the U.S. should also seek a study question at the Radiocommunications Sector to refine sharing techniques at this frequency. (The exact parameters of the definition of public safety as used in the attached Resolution may be refined in the forthcoming ITUR processes.)

While the 1995 conference is too soon for full consideration of this issue, the conference should lay the ground work for consideration by the conference following in 1997.

RESOLUTION NO. XX0

**Relating to Use of the Land Mobile Service at
Frequencies Primarily Below 1 GHz for Public Safety**

The 1995 World Radiocommunication Conference

considering

- a) that the worldwide work of national and international organizations employing public safety radio services is of increasing importance and often indispensable;
- b) that these public safety organizations offering such communications have limited funds and require relatively inexpensive communications systems;
- c) that efforts conducted by such organizations increasingly require international national communications;
- d) that communication facilities are frequently overloaded, damaged, completely interrupted, or not available at times critical to public safety;

further considering

- e) that the number of terrestrial mobile systems, particularly below 1 GHz, for use in public safety applications is expected to grow rapidly;
- f) that additional terrestrial mobile systems are being planned and implemented in various Regions by Administrations;
- g) that communications systems for public safety mobile operations below 1 GHz, particularly those at frequencies nearby those currently used for public safety operations, are generally less expensive than systems for operations above 1 GHz;

noting

that preliminary investigation indicates that new terrestrial mobile systems with regional or global allocations could serve significant unmet public safety needs either across national boundaries or through common equipment;